

## **CHEVRON ENJOY SCIENCE PHASE 2 PROJECT DESCRIPTION**

The SEAMEO Regional Centre for STEM Education (SEAMEO STEM-ED) has been awarded a grant by the Chevron Corporation to sustain the Thailand Partnership Initiative (Chevron Enjoy Science project phase 2). The project is a seven-year, public-private-partnership program aimed at strengthening Thailand's competitiveness and innovation by improving science, technology, engineering, and mathematics (STEM) education in both formal and informal settings. During 2020-2022, Phase 2 of the project will enhance the impact of Enjoy Science (ES) made during Phase 1 by deepening and extending its achievements and by ameliorating the challenges it has faced. Most importantly, Phase 2 will seek to align government policy and initiatives with ES and to build both the will and the capacity to sustain the initiative.

### **BACKGROUND**

Enjoy Science is an initiative to strengthen STEM education that has been supported by the Chevron Corporation in Thailand for the past five years. Implemented by the Kenan Institute Asia, ES has had a significant impact on the quality and character of STEM education in Thailand. Teachers and principals from over 600 schools have received professional development from ES. The project adopted a theory of action developed by the Consortium for Policy Research (CPRE) in the USA (Cohen and Ball, 1999). This model focuses on three critical dimensions of instruction: teachers, curriculum, and students. This theory contends that the effectiveness of instruction is determined by the interaction of teachers and students around curriculum.

ES sought to alter teachers' capacity by providing them with professional development that introduced them to new materials and high impact pedagogical practices (Corcoran and Silander, 2008; Windschitl et. al., 2018). The materials included well-designed science modules that support investigations; these modules have been shown to have much greater effects on learning than textbooks (Smithsonian, 2015). ES also sought to alter the math curriculum by providing teachers with teaching materials that encouraged problem-based learning, and incorporated the high impact practices. And it sought to affect student motivation by offering them camp experiences and exposure to informal science education to build interest and motivation (NAS, 2018).

ES forged partnerships with fifteen universities and supported their engagement with the schools in their provinces. The universities have served as hubs for STEM activities, expanding professional development opportunities for teachers and school leaders, strengthening the Professional Learning Communities (PLC) within and across the schools, and providing career days and other motivating experiences for students. Furthermore, 20 schools with strong leaders were selected to participate in a school improvement initiative. These schools were visited by an ES team, and school leaders joined the team to collect data on teaching and learning through classroom observations as well as collaborating in analysis of the Ordinary National Educational Test (ONET) results. Improvement priorities were set based on analysis of the data and the ES team guided the school's development of an improvement plan. The

progress of each school is being documented and early results were presented at Thaksin University's Annual Conference in May, 2019 and later at a Conference organized by Teachers' Council of Thailand (TCT).

## **OBJECTIVES**

Chevron Enjoy Science Phase 2 aims to strengthen the capacity of national and regional stakeholders in order to sustain and expand the work started in Phase 1. It is guided by the following objectives:

- To enhance STEM education in formal and informal education in Thailand;
- To build and sustain professional capacity within the education system by working more closely with government agencies and private partners;
- To build a culture of improvement within the schools;
- To introduce a college and career readiness program called Career Academies which has been proven, in many countries, to be a successful intervention to address the skills gap in the STEM workforce;
- To promote evidence-based policies and practices aimed at high-impact teaching and learning, effective school leadership and instructional supports by varied stakeholders which have been proven to increase student outcomes.

## **SCOPE OF THE PROJECT**

Phase 2 of the project will continue to build the capacity of stakeholders in STEM education in alignment with the national policies by:

1. Improving STEM teaching and learning inside and outside the classrooms in order to promote critical thinking and problem-solving by students. The project aims to develop master teachers, mentors, and instructional leaders who can help teachers deliver instruction which inspires students to learn and succeed in STEM. The project plans to create STEM Professional Academies for teachers and school leaders. The Academies will be accredited by relevant government agencies in partnership with leading universities and SEAMEO STEM-ED. The Academies will provide certificates of professional development for educators.
2. Enriching STEM learning resources for Thai education. Quality learning materials are critical for students to learn concepts, engage in problem-solving, and apply interdisciplinary knowledge and skills. The project intends to build the capacity of Thai educators to develop materials which address relevant problems and situations in the Thai or regional contexts. Experts will be recruited to assist and to share knowledge about learning module development with Thai educators. These learning modules will eventually be digitalized to make them accessible to a larger number of schools.
3. Strengthening and scaling professional learning communities (PLCs) and the Thailand School Improvement Program (TSIP). As PLCs have been mandated by the Ministry of Education as the mechanism for teachers to acquire and share teaching practices aimed

at improving student outcomes, the project will work closely with Teachers' Council of Thailand, the policy maker for teacher professional standards, to strengthen professional learning community practices for Thai educators. Moreover, the project is partnering with TCT to introduce the TSIP to enhance instructional leadership and create cultures of improvement in schools in order to raise the quality of teaching and learning as well as student performance.

4. Piloting Career Academies Program in high schools as a successful intervention for addressing the skills gap in the STEM workforce. The project intends to develop a college and career readiness program called Career Academies which will be established as small learning communities within secondary schools. The project will use career strands as an organizing framework for learning and instruction that helps students connect academic subjects and their applications to the world of work in a specific career pathway. Partnerships among employers, communities, and universities will be developed to provide resources, adult mentors, opportunities for students to engage in career-related work, and internships. Through engagement with national policy agencies, local governments, and employers, the STEM Career Academies will be piloted and evaluated before being proposed to policy makers for wider adoption nationally and region wide.
5. Capacity building of STEM awareness building agencies. By working with science awareness building agencies such as the National Science and Technology Development Agency (NSTDA), the National Science Museum (NSM), and the 19 Science Education Centres located nationwide, the project can expand and scale up the learning activities such as Maker Space, Enjoy Science Careers, and Thailand Children University (TCU) in rural areas. Science awareness experts from the New York Hall of Science and leading STEM awareness building consultants will be hired to guide government agencies on how to plan and upgrade the quality and management of the museums and learning centres with a more effective outreach to the target communities.
6. Policy Advocacy. The project plans to build the capacity of Thai researchers to conduct rigorous studies on the impact of the elements of the Chevron Enjoy Science model. Policy forums will be organized for researchers to share the findings with policy makers and research granting agencies on the interventions introduced by the project. Those interventions include high-impact instructional practices, school leadership practices, PLCs, the TSIP, and Career Academies. The sharing will lead to increased awareness of evidence-based policies and practices which will hopefully lead to better-informed policy decisions.

## **DELIVERABLES**

The deliverables for the project will be:

1. A professional development program, both face-to-face and online, to provide certificates of professional development for educators;

2. The development of core trainers for both STEM learning and STEM instructional leaders;
3. New STEM learning modules to be implemented at pilot schools, evaluated, and, if effective, digitalized for online access;
4. Studies on the impact of the elements of the Chevron Enjoy Science model which include the high-impact instructional practices, PLCs, TSIP, the Academies for teachers and instructional leaders, and Career Academies;
5. The sharing of the studies with policy makers and employers to secure additional funds to scale up the elements of the program;
6. New STEM awareness strategies and programs implemented by government agencies.

## **EXPECTED BENEFITS**

It is expected that the project will mobilize resources from responsible government agencies and interested private organizations to contribute to the strengthening of STEM education in both formal and informal education. The Centre expects to see the university hubs firmly established, and to institute STEM professional academies for both teachers and instructional leaders as well as gain support for the implementation of Career Academies. Thousands of schools with active PLCs, and hundreds of schools with strong improvement cultures will focus on improving teaching practices and increase student outcomes. Finally, policy makers will become more aware of the effectiveness of evidence-based policies and practices and will be better informed when making policy decisions on STEM education.

## **STAKEHOLDERS AND BENEFICIARIES**

- Policy makers: Teachers' Council of Thailand, the Office of the Teacher Civil Service and Educational Personnel Commission (OTEPC), the Office of the National Higher Education, Science, Research and Innovation Policy Council, Ministry of Higher Education, Science, Research and Innovation, Thailand, and similar agencies in the region;
- Professional Development agencies: the National Institute for Development of Teachers, Faculty Staff and Educational Personnel (NIDTEP), Faculty of Education or Science of leading universities in Thailand and in the region;
- Department of Skill Development (DSD), the Ministry of Labor, Thailand and similar agencies in the region in sharing training resources and facilities and developing skills standards for Career Academies;
- International partners with expertise in STEM professional development, instructional leadership, STEM resource development, STEM Career Academies, STEM awareness building, and policy advocacy;
- Bangkok Metropolitan Administration and provincial administrative organizations in Thailand with over 400 schools in Bangkok and over 300 in rural areas as the initial target recipients of the Thai School Improvement Program before expansion into other countries;
- Universities which are committed to implement the Career Academies program in partnership with the Centre;

- Employers in the selected industries.

### **PROJECT TIMELINE AND SOURCES OF FUNDS**

With the funding from Chevron Enjoy Science Project Phase II and the matching funds allocated by the government agencies, the project will begin in April 2020 and will end in March 2022. Additional funding will be sought to scale up elements of the project. A study of the program's effectiveness will be released and shared with policy makers in the region. The Centre will provide continued support for the adoption of elements of the program by governments in the region to set up their own STEM professional academies and career academies.